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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,669	06/27/2003	Justin K. Brask	ITL.1020US (P16707)	7093

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EXAMINER	
KORNAKOV, MICHAIL	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 08/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,669	BRASK ET AL.	
	Examiner	Art Unit	
	Michael Kornakov	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-13 and 18-20 are directed to a method of exposing a semiconductor wafer to a composition, claims 14-17 are directed to a cleaning composition; also claims 11-13 and 15-17 are directed to patentably distinct species of chelators. At the present time all claims were examined, however, Applicants are advised that if further amended or new claims are added, the election/restriction requirement can be imposed at any further stage of the prosecution.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2, 4, 6, 7, 9, 10, 13, 18-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

a) Although the specification states that the chelators are volatile, there is no indication and/or guidance in the instant specification on any volatilizing step, which step cannot be performed by those skilled in the art without undue experimentation.

b) Although the specification states the use of bidentate complexing agents in a ratio to metal centers of 3:1 it does not provide any evidence or guidance to the fact that the removal occurs for there bedentate chelaing ligands per metal center.

4. Claims 6 and 18 are also rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The step of volatilizing critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Therefore, it would be impossible to those skilled in the art to practice the step of volatilizing chelators without undue experimentation.

5. Claims 11-13 and 15-17 are also rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for ethylene diamine and bypyridine as N,N'chelators, acetylacetone as O,O' chelator, and dimethylephosphinoethane as P.P' chaltor, does not reasonably provide enablement for myriads of chelators identified as N,N', O.O' or P,P' chelators. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 4-7, 9-11, 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 01069014.

JP'014 discloses a method for removing a heavy metal contaminant, by exposing a semiconductor substrate to liquid or vapor of an organic solvent containing ***acetylacetone, which is a bidentate ligand containing chelating agent (O, O' chelator as exemplified in the instant specification***) so that any heavy metal adhered on the substrate is complexed, ***vaporized*** and removed, and then drying the semiconductor substrate. In order to clean a semiconductor wafer, IPA-diluted ***acetylacetone*** 10 is introduced and heated in a heating vessel 4. The semiconductor substrate 9 to be cleaned is inserted into the upper part of the vessel 4 in a cleaning chamber 1, so that it is exposed to ***vapor of acetylacetone***/IPA. Any heavy metal contaminant adhered on the substrate is reacted with the acetylacetone to produce a complex. The complex ***is vaporized*** and ***discharged through an exhaust port*** 2. The substrate is then transported through a connection chamber 8 into a drying/ozone treating chamber 5, where it is irradiated with ultraviolet light by a mercury lamp 7 to dry the organic vapor. Further, acetylacetone and IPA adhered on the substrate surface are completely removed by ozone atmosphere produced by decomposition of oxygen also introduced. In this manner, the cleaning of the substrate is completed (see abstract). With regard to the limitation of claims 6 and 9 that concerns removing three bidentate

chelating ligands per metal center (see also 112.1 rejection), it is noted that such limitation will be inherently fulfilled by JP'014, since the steps of the process, and composition used in JP'014 are identical to steps and composition of the instant claims, therefore, it is axiomatic that one who performs the steps of a process must necessarily produce all of its advantages. Mere recitation of a newly discovered property or **function** that is inherently possessed by the things or steps in the prior art does not cause a claim drawn to those things to distinguish over the prior art, Leinoff v. Louis Milona & Sons, Inc. 220 USPQ 845 (CAFC 1984)

8. Claims 1-11, 14, 16, 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2002 001242.

JP'242 discloses a method for highly efficiently cleaning a semiconductor substrate. The method for cleaning a substrate comprises cleaning the surface of the substrate with a supercritical ***fluid of carbon dioxide and a chelating agent perfectly miscible with supercritical carbon dioxide.*** The chelating agent has the function of converting the substrate into a chelate compound and dissolving the compound and is desirably ***acetylacetone*** (O.O' chelator of the instant claims). The substrate is made from a metal or a metal compound. The metal is at least one member selected from iron, chromium, nickel, copper, zinc, tin, aluminum, and titanium or an alloy containing at least one of them. The metal compound is copper oxide or zinc oxide. The substrate is kept in the supercritical fluid. The cleaning method of material (1) involves using supercritical fluid comprising chelating agent having intimate mixture property with

carbon dioxide, and supercritical carbon dioxide, followed by washing the surface of the cleaned material (Abstract).

9. Claims 1-10, 12, 14-15, 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sehgal (US 20040050406).

Sehgal discloses a method of removal of photoresist and/or resist residue from a semiconductor wafer that includes exposing the substrate to an environmentally friendly, non-hazardous co-solvent mixture comprising a carbonate, an oxidizer and an accelerator. The process is performed in the presence of a supercritical fluid such as ***supercritical carbon dioxide*** (abstract). Claims 72 and 73 provide for the embodiment when the recipe com[position for removal photoresist from semiconductor wafer include supercritical carbon dioxide and ***ethylene diamine***. Ethylene diamine is a N, N'-chelator as exemplified in the instant specification. Volatilizing inherently occurs in the system when ethylene diamine is carried by supercritical carbon dioxide.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP' 242 or Senhal as applied to claims 10 and 14 above, ad further in view of U.S. 6,767,708.

While disclosing, O,O'chelator and N,N' chelator as exemplified in the instant specification, JP'242 and Senhal do not specifically identify P,P-chelators. US'708 recognizes equivalency as chelators. ***Chelators of interest*** include the following: 2,2'-dipyridine, ***or bipyridine*** 1,2-bis(diethylphosphino)ethane 1,2-bis(diethylphosphino)methane o-phenylenebisdimethylarsine diethylenetriamine, 1,2-***bis(diphenyl-phosphino)ethane,*** dppe ethylenediaminetetraacetic acid ***ethylenediamine*** tris-(2-dimethylaminoethyl)amine bis-(2-diphenylphosphinoethyl)amine tris-(2-diphenylphosphinoethyl)amine 1,10-

phenanthroline propylenediamine(1,2-diaminopropane) bis-(2-diphenylphosphinoethyl)amine, tris-(2-diphenylphosphinoethyl)phosphine, tris-(3-dimethylarsinopropyl)phosphine [P(CH.sub.2 CH.sub.2 CH.sub.2 AsMe.sub.2).sub.3] bis-(3-dimethylarsinopropyl)methylarsine ; N,N,N',N'-tetramethylethylenediamine (also TMED, tmed) 1,3-diaminopropane(trimethylenediamine) tris-(2-diphenylphosphinoethyl); tris-(2-aminoethyl), triethylenetetraamine , tris-(2-methylthiomethyl)amine etc.

US'708 is a prior art reference that is reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case the equivalency of different chelating agents is the problem with which Applicant is concerned. In the instant case substitution of equivalent methods of using P.P' chelators or O,O' chelators or N, N' chelators requires no express motivation, as long as the prior art recognizes equivalency, ***In re Fount*** 213 USPQ 532 (CCPA 1982); ***In re Siebentritt*** 152 USPQ 618 (CCPA 1967); ***Graver Tank & Mfg. Co. Inc. V. Linde Air products Co***. 85 USPQ 328 (USSC 1950).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. KORNAKOV

Michael Kornakov
Primary Examiner
Art Unit 1746

08/06/2005